Listing of claims

1-31. (Canceled)

32. (Previously presented) An interconnect structure comprising:

an insulating layer over a semiconductor structure having an opening therein;

a fill layer comprised of Cu and Ti filling said opening in said insulating layer; and

a self-passivation layer comprised titanium nitride over said fill layer.

33. (Previously presented) The structure according to Claim 32 further comprising a barrier layer over said insulating layer and underlying said fill layer.

34. (Previously presented) The structure according to Claim 32 wherein said insulating layer is comprised of a low-k material.

35. (Previously presented) The structure according to Claim 32 wherein said self-passivation layer is comprised of oxygen-rich titanium nitride.

36. (Previously presented) The structure according to Claim 32 wherein said opening is a dual damascene shaped opening.

37. (Presently amended) ~~The structure according to Claim 33~~ An interconnect structure comprising:

an insulating layer over a semiconductor structure having an opening therein;

a fill layer comprised of Cu and Ti filling said opening in said insulating layer;

a self-passivation layer comprised titanium nitride over said fill layer; and

a barrier layer over said insulating layer and underlying said fill layer, wherein said barrier

layer comprises TaN.

38. (Previously amended) The structure according to Claim 33 wherein said barrier layer is comprised of tantalum nitride, molybdenum, tungsten, chromium, or vanadium.

39. (Previously presented) The structure according to Claim 33 wherein said barrier layer has a thickness of between about 50 and 2000 Angstroms.

40. (Previously presented) The structure according to Claim 32 wherein said Ti is essentially uniformly distributed through said fill layer.

41. (Previously amended) An interconnect structure comprising:

an insulating layer over a semiconductor structure having an opening therein;

a barrier layer over said insulating layer conformally within said opening;

a fill layer comprised of Cu and Ti filling said opening in said insulating layer and overlying said barrier layer wherein the fill layer has a Ti concentration ranging between about 0.1 and 2.0 weight %.; and

a self-passivation layer comprised titanium nitride over said fill layer.

42. (Previously presented) The structure according to Claim 41 wherein said insulating layer is comprised of a low-k material.

43. (Previously presented) The structure according to Claim 41 wherein said self-passivation layer is comprised of oxygen-rich titanium nitride.

44. (Previously presented) The structure according to Claim 41 wherein said opening is a dual damascene shaped opening.

45. (Previously presented) The structure according to Claim 41 wherein said barrier layer comprises TaN.

46. (Previously amended) The structure according to Claim 41 wherein said barrier layer is comprised of tantalum nitride, molybdenum, tungsten, chromium, or vanadium.

47. (Previously presented) The structure according to Claim 41 wherein said barrier layer has a thickness of between about 50 and 2000 Angstroms.

48. (Previously presented) The structure according to Claim 41 wherein said Ti is essentially uniformly distributed through said fill layer.

49. (Previously presented) An interconnect structure comprising:

an insulating layer over a semiconductor structure having an opening therein;

a fill layer comprised of Cu and Ti filling said opening in said insulating layer wherein said Ti is essentially uniformly distributed through said fill layer; and

a self-passivation layer comprised titanium nitride over said fill layer.

50. (Previously presented) The structure according to Claim 49 further comprising a barrier layer over said insulating layer and underlying said fill layer.

51. (Previously presented) The structure according to Claim 49 wherein said insulating layer is comprised of a low-k material.

52. (Previously presented) The structure according to Claim 49 wherein said self-passivation layer is comprised of oxygen-rich titanium nitride.

53. (Previously presented) The structure according to Claim 49 wherein said opening is a dual damascene shaped opening.

54. (Previously presented) The structure according to Claim 50 wherein said barrier layer comprises TaN.

55. (Previously amended) The structure according to Claim 50 wherein said barrier layer is comprised of tantalum nitride, molybdenum, tungsten, chromium, or vanadium.

56. (Previously presented) The structure according to Claim 50 wherein said barrier layer has a thickness of between about 50 and 2000 Angstroms.

57. (Previously Presented) The structure according to Claim 32 wherein said fill layer has a Ti concentration ranging between about 0.1 and 2.0 weight %.

58. (Previously Presented) An interconnect structure comprising:

an insulating layer over a semiconductor structure having an opening therein;

a fill layer comprised of Cu and Ti filling said opening in said insulating layer wherein said Ti concentration ranges between about 0.1 and 2.0 weight %; and

a self-passivation layer comprised titanium nitride over said fill layer.

59. (Previously Presented) The structure according to Claim 58 wherein Ti is essentially uniformly distributed through said fill layer.

60. (Previously Presented) The structure according to Claim 58 wherein said insulating layer is comprised of a low-k material.

61. (Previously Presented) The structure according to Claim 58 wherein said opening is a dual damascene shaped opening.

62. (Previously Presented) The structure according to Claim 58 further comprising a barrier layer disposed between the insulating layer and the fill layer.